GENERAL BOTANY Lecture 23 - Pollination

I. Pollination - definition and breeding pattern
- A. Pollination - transfer of pollen from the anther to the stigma
- B. Breeding pattern
  - 1. Plants are at the mercy of pollen carriers (vectors)
    - a) Plants pollinated by vectors which travel great distances
      - 1) Wind & bumblebees - lead to "effective" breeding populations
    - b) Plants pollinated by vectors which travel short distances
      - 1) Small insects - localized breeding populations

II. Pollination systems: self- and cross-pollination
- A. Self-pollination - plants pollinated by their own pollen
  - 1. Many cultivated plants (beans, peas, and tomatoes)
    - a) Good/bad news of self-pollination
      - 1) Homozygosity (more uniform)
      - 2) Focus on adaptation to environment (desert animals)
- B. Cross-pollination - plants receiving pollen from other plants
  - 1. Pollination by insects, wind, birds, mammals, and water
  - 2. Mechanisms to prevent self-pollination (most plants)
    - a) Self-incompatibility mechanisms - Camellia
    - b) Timing mechanisms (readiness of stigma & anther) - lily and amaryllis
    - c) Sex parts on different plants (dioecious) - ginkgo, willow, and poplar
  - 3. Good/bad news of cross-pollination
    - a) Heterozygosity
    - b) Focus on diversity and survival in environment

III. Regulatory factors of pollination vectors - maximization of pollination efficiency
- A. Wind pollination - no color, little scent, small, and often dioecious
- B. "Rewards" provided by the plant
  - 1. Food (insects, birds, and mammals)
    - a) Pollen, nectar, and oil
  - 2. Sensory (insects, birds, and mammals)
    - a) Odor, visual (shape, size, color), temperature, motion
- C. Attracting pollinators
  - 1. Most pollinators
    - a) Attracted to a single showy flower
    - b) Bees cannot perceive red light - but can perceive UV light
      - 1) Bees mostly attracted to yellow and blue flowers (w / UV stuff)
  - 2. Animal pollinators (insects and mammals)
    - a) FOOD!!! - nectar, oil, pollen, etc.
    - b) Rest area - warmth, breeding, etc.
    - c) Odor - sweet, fruity, sexy, etc.
  - 3. Insect pollinators
    - a) Color & nectar guides
    - b) Odor - sweet, fruity, putrid (flies & beetles), "female-like"
  - 4. Specific insects: moths and butterflies
    - a) Day and night flowers
    - b) Moths - flowers emit fragrance at night
    - c) Some butterflies see red light
  - 5. Birds
    - a) Can see red light
    - b) Flowers usually not scented, but brightly colored (cacti, columbines, hibiscus, bananas, etc.)
  - 6. Mammals - bats, marsupials, and monkeys
    - a) Bats - strong, fruity odors
    - b) Others (climbers) - possum, monkey